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IS 12748 (1989): Motion picture safety film [MED 32: Photographic Equipment]

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Indian Standard

CINEMATOGRAPHY—MOTION PICTURE SAFETY FILM—SPECIFICATION

भारतीय मानक

चलचित्रिकी — चलचित्र निरापद फिल्म — विशिष्टि

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July 1990 **Price Group 3**

Cinematographic Equipment Sectional Committee, ETDC 47

FOREWORD

This Indian Standard was adopted by the Bureau of Indian Standards on 11 September 1989, after the draft finalized by the Cinematographic Equipment Sectional Committee had been approved by the Electrotechnical Division Council.

The term 'motion-picture film' as used in this standard includes perforated and unperforated film used in the motion-picture industry, for example, leaders; sensitized stock based on the silver halide, dye transfer, vesicular or other image-producing systems; raw and processed stock; magnetically coated perforation film and film coated with lacquers.

While preparing this standard, assistance was derived from ISO/DIS 543 Cinematography — Motion-picture safety film — requirements and methods of testing.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 : 1960 'Rules for rounding off numerical values (*revised*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard

CINEMATOGRAPHY — MOTION PICTURE SAFETY FILM — SPECIFICATION

1 SCOPE

1.1 This standard specifies requirements and corresponding methods of test for motion picture safety film with respect to fire hazards.

1.2 This standard does not apply to safety photographic films not used in motion picture.

2 TERMINOLOGY

For the purpose of this standard, the following definitions shall apply.

2.1 Motion Picture Film

A thin flexible ribbon of transparent plastic having perforations and bearing one or more sensitized layers capable of producing photographic images.

NOTE — The term 'film' may be applied to unexposed film, to exposed but unprocessed film, and to exposed and processed film.

2.2 Motion Picture Safety Film

Motion-picture films which pass the ignition time test and burning time test as specified in this standard.

3 REQUIREMENTS

3.1 Ignition Time

Motion-picture films are classified as having passed the ignition time test if the ignition time is greater than 10 minutes when tested as specified in **5**.

3.2 Burning Time

3.2.1 Motion-picture films having a thickness equal to or greater than 0·08 mm are classified as having passed the burning time test if the burning time is not less than 45 seconds when tested as specified in **6.1**. Motion-picture films having a thickness less than 0·08 mm are classified as having passed the burning time test if the burning time is not less than 30 seconds when tested as specified in **6.1**.

3.2.2 Motion-picture films are classified as having passed the burning time test if the burning time is not less than 120 seconds when tested as specified in **6.2**.

4 FIELD TEST

4.1 Principle

The following test method may be used for quickly identifying whether most cinematographic films are of the safety or of the nitrate variety, without technical equipment or the expenditure of large amounts of specimen film, it does not determine compliance of a film with this standard.

Anyone unfamiliar with the burning of safety and nitrate photographic films should first conduct this test on samples of both types of films, the identities of which are known.

4.2 Preparation of Test Sample

Cut a piece of film approximately 16 mm wide and 35 mm long. Bend the film lengthwise and crease it sufficiently so that when released it will stand upright.

4.3 Procedure

Stand the film sample (with the crease vertical) on a flat fireproof surface such as an ashtray, glass plate, concrete floor, etc. This shall be done at a safe distance from all film stocks. With a match flame, ignite one of the top corners of the film.

4.4 Expression of Results

If the film ignites easily, burns downward rapidly and vigorously with a bright yellow flame, and is completely consumed in less than 15 seconds, it probably contains dangerous quantities of cellulose nitrate and probably will not pass the tests of standard for safety film. If the film sample ignites with difficulty, and burns only partially or if it burns completely in a time not under 15 seconds, it is likely but not assured that the sample will pass the tests described in this standard.

5 IGNITION TIME TEST (TYPE TEST)

5.1 Equipment

Make the test in an electric resistance oven, the interior of which is in the form of a vertical cylinder (preferably with a rounded bottom), having a diameter of 70 mm and a mean height of 70 mm. The top of the oven shall be closed by means of a closely overlapping lid having two holes of diameter 7 mm and 15 mm, respectively, the centres being at a distance of about 15 mm from each other. Introduce a thermocouple (*see* IS 7358 : 1984 Specification for thermocouples) through the smaller opening, the connecting wires having a porcelain coating fitted tightly into the hole. Alternatively, the temperature in the cylinder may be measured by means of other temperature measuring instruments such as a mercury thermometer protected from rising heat by means of a cork also inserted into the lid.

5.2 Preparation of Test Samples

Cut three samples 35 mm long and 8 mm wide from the film to be tested. The sample shall be free of perforations as far as is practicable. Condition the sample for at least 4 hours at a temperature of 27 ± 2°C and a relative humidity of 45 to 65 percent.

5.3 Procedure

Bring the oven (*see* **5.1**) to, and maintain it at, a temperature of 300 ± 5°C. When this temperature is reached, attach one sample to a thin U-shaped wire-hook and introduce it through the larger opening. Fix the instrument for measuring temperature and the samples in such a way that the thermojunction (or mercury bulb) and the centre of the sample are at an equal depth of approximately 35 mm.

Test the three samples and thoroughly vent the oven before and between each measurement.

5.4 Expression of Results

Note the temperature and record the time interval from the insertion of the sample to the ignition of the sample as the ignition time.

If any one of the three samples does not meet the ignition time requirement, the material is considered to have failed.

6 BURNING TIME TEST (TYPE TEST)

6.1 The burning time may be determined by either of the two methods specified.

6.1.1 *Method A*

6.1.1.1 *Preparation of test samples*

Cut three samples each 400 mm long and 35 mm wide from the film to be tested. If only films narrower than 35 mm are available, samples 400 mm long and their full width may be tested. Motion-picture films, when tested by this method, have similar flame propagation characteristics and approximately the same burning times, regardless of whether the width of the sample tested is 16 mm or 35 mm. Mark each sample at a point 50 mm from each end. If the samples are not already perforated, perforate them with holes approximately 3 mm in diameter along one edge, at intervals of not more than 20 mm. Thread a wire having a diameter of not more than 0·5 mm through the perforations on one side so that the sample is supported at points not more than 20 mm apart.

Condition the samples for at least 4 hours at a temperature of 27 ± 2°C and a relative humidity of 45 to 65 percent.

NOTE — Experience has shown that safety film will meet the requirements for burning time when conditioned to any relative humidity in the range of 10 to 70 percent. The more stringent range of 45 to 65 of this test method is specified in the interest of obtaining strictly comparable results. Likewise the 4 hours conditioning time is not critical and may be reduced to 1 hour minimum, if the urgency of the test makes this desirable.

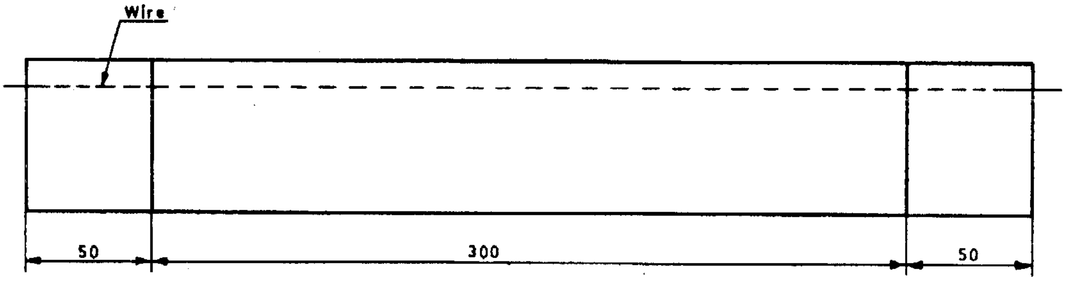
6.1.1.2 *Procedure*

Make the test in a room free from draughts.

With the wire stretched horizontally and the sample hanging vertically from it, ignite the bottom of one end (*see* Fig. 1). Test the three samples.

6.1.1.3 *Expression of results*

Record the time which elapses from the moment the flame reaches the first mark until it reaches the second mark as the burning time.



All dimensions in millimetres.

FIG. 1 BURNING TIME TEST SAMPLE (NOT TO SCALE)

If the sample does not ignite or if the flame does not reach the second mark within the stipulated time, classify the film as having passed the burning time test.

If any one of the three samples does not pass the burning time test, the material is considered to have failed.

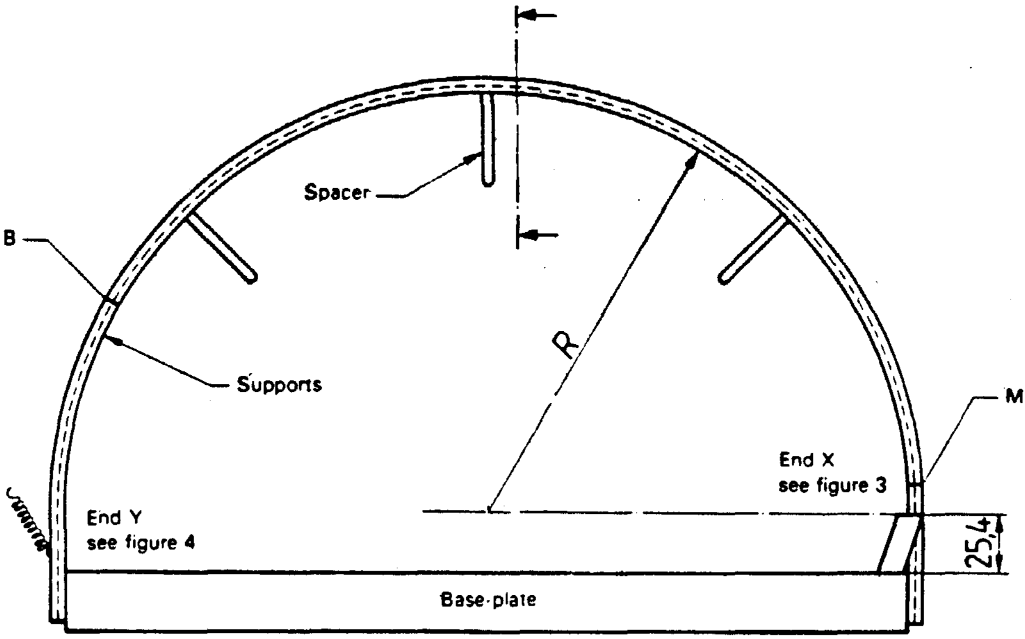
6.1.2 *Method B*

6.1.2.1 *Apparatus for 35 mm film*

Test samples of 35 mm film on an apparatus complying with the following requirements.

The apparatus shall consist essentially of two semicircular supports, each L-shaped in cross-section, curved to a radius of 178 mm spaced apart at a suitable distance for supporting the film with the angles, and structurally completed by a base-plate tying the two ends together (*see* Fig. 2, 3 and 4).

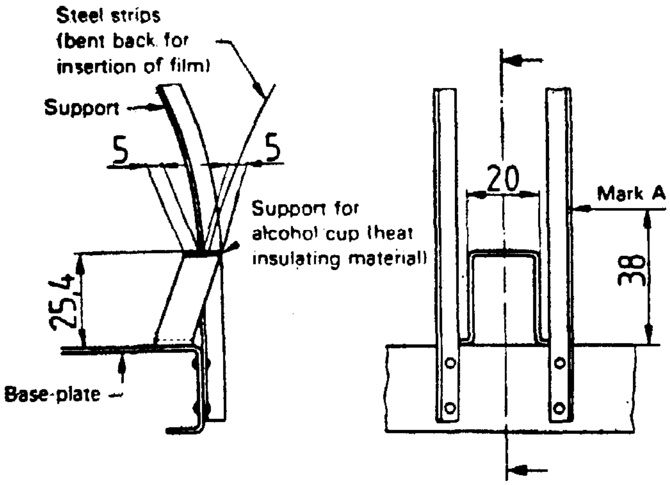
NOTE — Details of end *x* and end *y* as given in Fig. 2, are given in Fig. 3 and 4 respectively.



Film	35 mm	16 mm
P	178	229

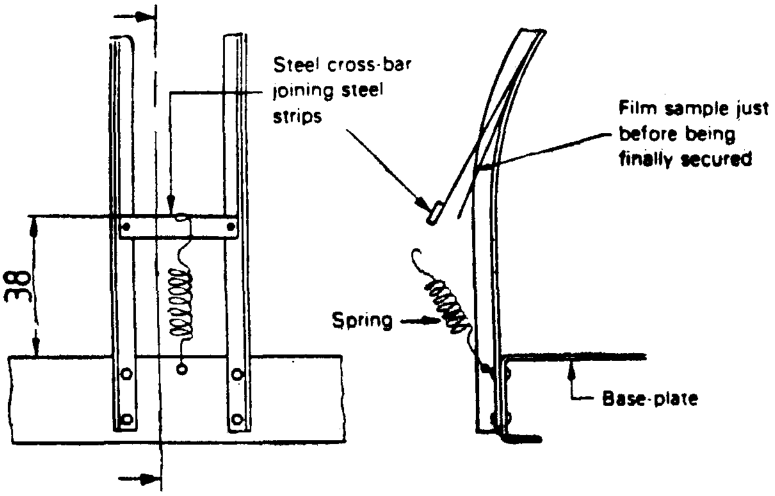
All dimensions in millimetres.

FIG. 2 GENERAL ARRANGEMENT OF APPARATUS FOR FLAMMABILITY TEST OF SAFETY FILM


Steel strips (bent back for insertion of film)
Support
5
5
Support for alcohol cup (heat insulating material)
25,4
Base-plate
20
Mark A
38

All dimensions in millimetres.

FIG. 3 DETAIL OF END X FOR 35 mm FILM APPARATUS


Steel cross-bar joining steel strips
Film sample just before being finally secured
38
Spring
Base-plate

All dimensions in millimetres.

FIG. 4 DETAIL OF END Y FOR 35 mm FILM APPARATUS

The two supports shall be made of mild steel, about 1·2 mm thick, and shall be spaced so that their inner edges are 25·4 mm apart, the spacers being of wire shaped as shown in Fig. 5.

The film sample shall be held in position over the semicircular supports by two strips of spring steel, 4·8 mm wide by 0·12 mm thick, each of which is riveted at one end for support. The other ends of the two steel strips shall be connected, at the appropriate distance apart, by a thin steel crossbar. At the igniting end there shall be, between the supports, a flat platform of heat insulating material (mica, asbestos, etc), on which a small alcohol cup may be placed. The upper surface of the platform shall be 25 mm above the base-plate and shall be 20 mm × 10 mm.

The alcohol cup shall be of copper and shall have the dimensions shown in Fig. 6.

One curved support shall carry two register lines of marks, as shown in Fig. 2, which shall be clearly visible when the film sample is in position, and which shall be marked *A* and *B* respectively.

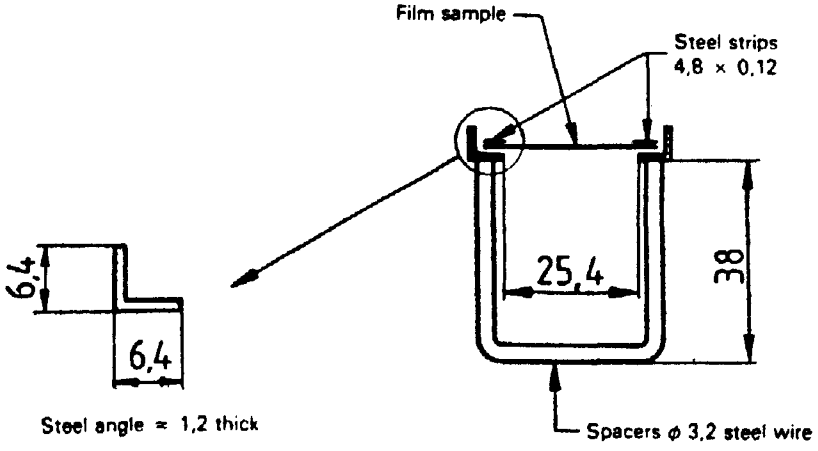
The mark *A* shall be 38 mm above the base-plate at the igniting end. The mark *B* shall represent the position which would be occupied by the end of a piece of film 457 mm long, whose other end coincides with the mark *A*.

All dimensions shown are nominal except for sample size.

Construction of the apparatus should be with standard material closest to the dimensions quoted in each figure.

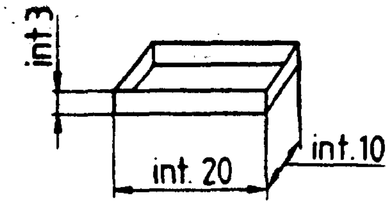
6.1.2.2 *Apparatus for 16 mm film*

The apparatus is similar in general form to that specified above for the testing of 35 mm film.



All dimensions in millimetres.

FIG. 5 SECTION THROUGH SUPPORTS SHOWING WIRE SPACERS FOR 35 mm FILM APPARATUS



All dimensions in millimetres.

FIG. 6 ALCOHOL CUP FOR 35 mm FILM APPARATUS

The circular supports are curved to a radius of 229 mm. They shall be made of mild steel approximately 0·9 mm thick, formed at the dimensions shown in Fig. 7, and shall be spaced so that their inner edges are 12 mm apart, the spacers being of wire shaped as shown in Fig. 7. The film sample shall be held in position by steel strips similar to those for the test of 35 mm film. The upper surface of the platform of heat insulating material shall be 25 mm above the base-plate and shall be 10 mm square. The alcohol cup shall be of copper and of the dimension shown in Fig. 8. The mark A shall be 38 mm above the base-plate at the igniting end. The mark B represents the position which would be occupied by the end of a piece of film 457 mm long, whose other end coincides with the mark A.

All dimensions shown are nominal except for sample size.

Construction of the apparatus should be with standard material closest to the dimensions quoted in each figure.

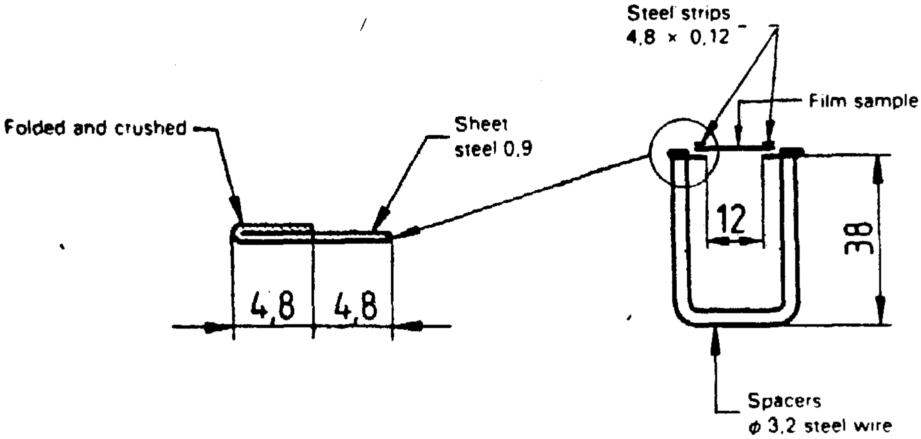
6.1.2.3 *Preparation of test samples*

Take the test samples from either end or both ends of the continuous length of film which is to be examined. For the purpose of the burning test, take six samples, each of a length of 533 mm for both 35 mm and 16 mm film. Test the samples in the condition in which they are cut from the continuous length without removal of protective or magnetic coatings, strips of emulsion. Condition the samples for at least 4 hours at a temperature of 27 ± 2°C and a relative humidity of 45 to 65 percent.

NOTE — It is important to observe that the whole of the sampling for both methods of test shall be taken from the same continuous length, and that if the roll of film to be examined contains splices, then each individual length be examined separately. The object of taking six samples for the burning test is to obtain accurate results in the test and not confirm the homogeneity of the film, the samples may therefore be taken consequently.

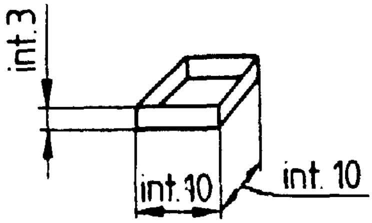
6.1.2.4 *Procedure*

Place the film sample in the trough formed by the two L-section supports, with its end in line with the mark *A*. Draw the steel strips over and Hold them by a small spring which clips on to the crossbar which joins them at their free end (*see* Fig. 5). Thus, the film is securely held by a narrow portion at each side and the centre portion of approximately 25 mm of the film is in free air. If the sample to be tested is coated film, place the sample with the coating upwards. Place the copper cup on the platform centrally below the film; place 0·3 ml of alcohol (not less than 95 percent) in it and ignite.



All dimensions in millimetres.

FIG. 7 SECTION THROUGH SUPPORTS SHOWING WIRE SPACERS FOR 16 mm FILM APPARATUS



All dimensions in millimetres.

FIG. 8 ALCOHOL CUP FOR 16 mm FILM APPARATUS

6.1.2.5 *Expression of results*

Record the time which elapses from the time of ignition until the flame reaches mark *B* as the burning time. If, for each of six samples the sample does not ignite, or if the flame does not reach mark *B* within 120 seconds, classify the film as having passed the burning time test. If any one of the six samples does not pass the burning time test, the material is considered to have failed.

7 MARKING

7.0 Cinematographic film which meets the requirements of this standard, may be suitably marked as such.

7.1 Markings between perforations or along the edge of the film comprising 'S' or 'safety' may be used. An alternative or supplementary way of marking is by means of a fluorescent compound in or on the film base. National regulation may require these or other markings, but this practice is not a mandatory requirement of this standard.

7.2 Safety identification marking applied at the time of film manufacture is sometimes obliterated or transferred from another film in pointing operations, so the identification is lost or confused. If the film cannot be positively identified as safety film by the marking it should be identified by the laboratory tests specified in this standard. Where there is a very limited quantity of film and a small degree of uncertainty is acceptable, the field test given in **4** may be sufficient.

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